FIG. 9

[0019] ~~FIG. 8~~ illustrates another example of an EXIT curve matching for nonsystematic check-biregular RA codes.

[0020] FIG. 10 is a bit error rate (BER) chart for various MIMO channels.

DETAILED DESCRIPTION OF THE EXEMPLARY EMBODIMENTS

[0021] The exemplary embodiments of the present invention are directed to a modulation and coding scheme that employs nonsystematic repeat-accumulate codes (also referred to as check-biregular, nonsystematic RA (BNRA) codes) that are generated by an encoder at a transmitter and decoded by a composite detector/decoder arrangement at a receiver. The transmitter and receiver may be part of a MIMO communication system, for example, although the exemplary embodiments to be described below could be applicable to any communication system employing multiple channel inputs and multiple channel outputs, including, but not limited to DSL communication and cable systems.

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[0022] In an exemplary embodiment, the composite detector/decoder arrangement employs an inner detection loop for detection and decoding of a BNRA-encoded signal. In another exemplary embodiment, the composite detector/decoder arrangement employs a trellis detector, or 'MIMO trellis detection' for detection and decoding of the BNRA-encoded signal. In each of the exemplary embodiments, close-to-capacity performance may be achieved by substantially matching transfer characteristics curves ('curve-fitting') of a decoder and a detector in the composite arrangement. A modulation and coding scheme employing BNRA codes and MIMO trellis detection may reduce complexity and improve robustness against code parameter mismatches.

[0023] BNRA codes may be designed for both scalar channels and vector channels by using a curve--fitting procedure on extrinsic information transfer (EXIT) charts, as will be seen in further detail below. The vector channel (multi--input, multi--output or MIMO) code designs are evaluated for two